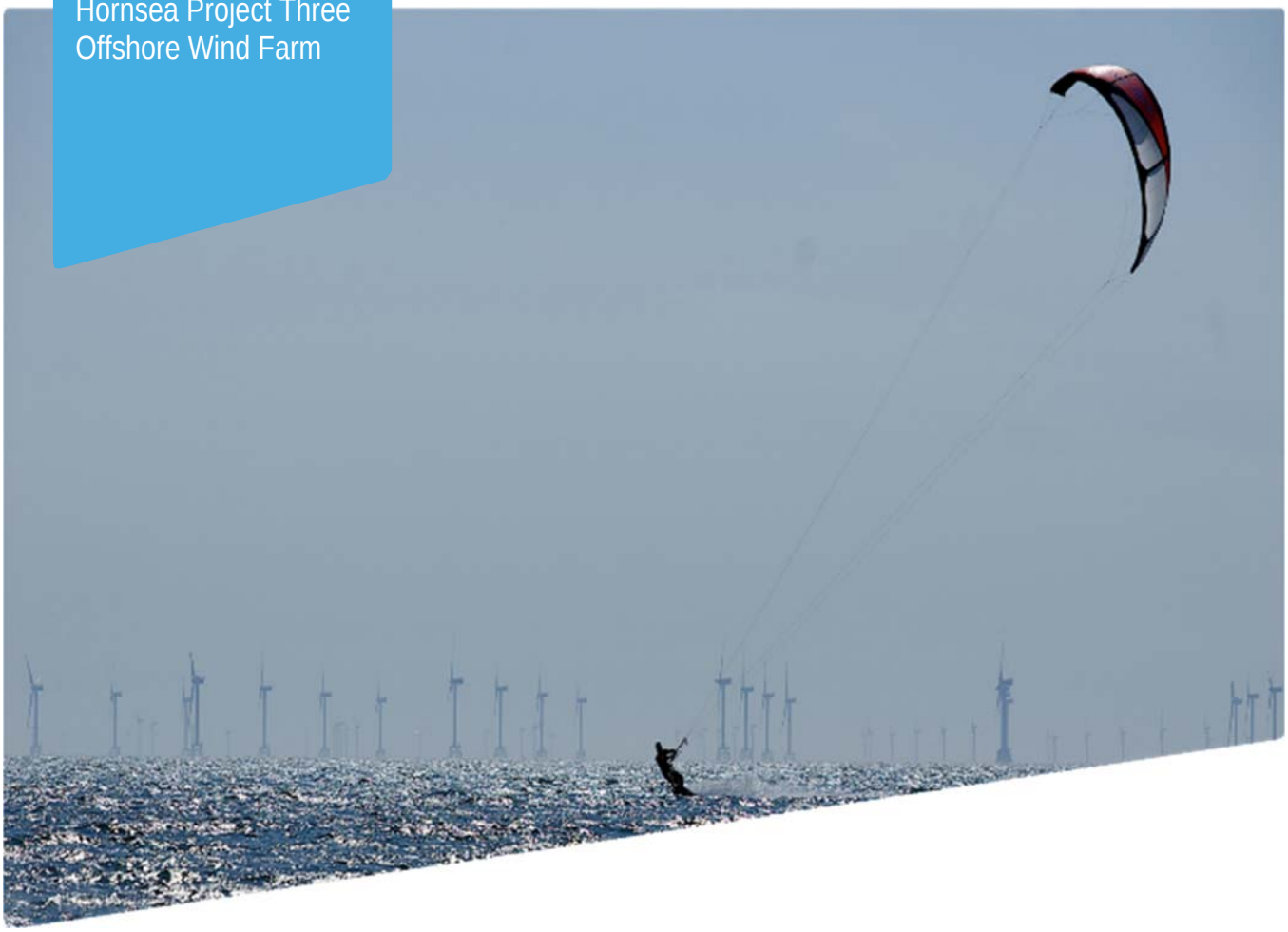
Hornsea Project Three
Offshore Wind Farm



# Hornsea Project Three

# Offshore Wind Farm

## Appendix 29 submission at deadline 7 – Aviation Meeting Minutes – CHC Helicopter Operator

Date: March 2019

Hornsea 3
Offshore Wind Farm

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# Appendix 29 – Aviation Meeting Minutes – CHC Helicopter Operator

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Front cover picture: Kite surfer near a UK offshore wind farm © Ørsted Hornsea Project Three (UK) Ltd., 2018.

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## Table of Contents

# 1. Introduction

1.1 The Applicant and Spirit Energy (represented by Aviateq) met with CHC (the operator currently contracted by Spirit Energy to fly to the Chiswick, Grove and J6A platforms) on February 21, 2019. The purpose of the meeting was to agree the assumptions used to inform the aviation assessments presented by the Applicant in regard to the potential effect of Hornsea Three on helicopter access to the Spirit Energy operated platforms.

1.2 The slides presented by the Applicant as an aid to the discussion are include as Annex 1 to this Appendix.

A summary of the key points from the meeting has been agreed by CHC and is presented as section 2 of this Appendix. The meeting summary makes reference to the slides included as Annex 1.

# 2. Key points from CHC meeting 21 February 2019

Meeting Objectives

- To understand the approaches presently flown by CHC to the Chiswick and Grove platforms and under what meteorological conditions these approaches are flown.
- To understand what approaches CHC will be able to continue to fly the Chiswick and Grove platforms with Hornsea Three and under what meteorological conditions these approaches will be flown.
- To understand what approaches CHC consider may be restricted as a result of Hornsea Three.
- To discuss with CHC whether there are alternative flight paths which could be flown to the Chiswick and Grove platforms which would reduce any restrictions on access arising as a result of Hornsea Three, and to consider how technology can be used to enhance safety and operations.

Slide 10 CHC approaches to Chiswick and Grove platforms

- CHC follow EASA legislation, EASA HOFO as well as UK CAP 1145.
- When CHC flies for Spirit they are using EASA limits.
- CHC currently fly en route let downs, when the weather is suitable as this expedites the approach and gives the client a higher payload.
- The CHC ARA profiles have an Intermediate Approach Fix (IAF) at 7 and and the Final Approach Fix (FAF) at 5 NM (CHC OM), with a to 200ft MDH by day and 300 ft by night.
- CHC currently fly from Den Helder and Norwich.
- CHC currently fly to both J6A and onward shuttle, or direct to Chiswick and Grove.
- The AW139s operating on this contract are not cleared for icing. When icing conditions are present they can operate down to 1000 ft IMC to keep clear of icing conditions, or remain VMC.
- Circling approaches are regularly flown with a MDH of 300 ft.
- ARA can accept some wind offset (up to 15 degrees of drift is permitted).
- Wind restriction of 60 knots is for platforms (not helicopter capability). Some NUI this limit is 45 knots.
- PinS will be available in the future. All pilots are to be trained in PBN capabilities by 2020.
- Helicopter terrain awareness systems (HTAWS) will be implemented in new helicopters.

Slide 12 ARA

2.1 This slide is correct – with exception of ARA lower limits – this should read 200ft clear of cloud not, 200ft (100ft below cloud).

Slide 13 ARA

2.2 This slide is correct – with exception CHC fly Intermediate Fix 7nm and FAF 5nm (CHC OM) not 6 and 4, as per the EASA Guidance.

Slide 14 En Route descent

2.3 This slide is correct.

Slide 15 Shuttle flights

2.4 This slide is correct – with exception of a minimum height of 300 ft and clear of cloud (not cloud base) Ref 24 and 500ft minimum height and clear of cloud (not cloud base).

- Shuttle flights are flown – but also consider circling flights.
- Circling approach requires 300ft 1 nm (day) and 500ft 1.5 nm (night).
- Circling approaches are preferable to moving the Missed Approach Point.
- Circling approaches require 2 - 2.5 nm room for manoeuvre.
- Grove at 2.4 nm is considered adequate room to manoeuvre.

Slide 16 Restricted approaches as a result of Hornsea Three

| Approach | Restriction due to Hornsea Three |
|---|---|
| VFR | No |
| ARA | Yes – when weather minima requires ARA and wind dictates approach from east over wind farm |
| En Route | No restriction as the descent would be made en route and then a VFR approach made – in certain wind directions overflight may be required and turn back for approach into wind. |
| Shuttle | No |
| Circle | No for Grove<br>Yes for Chiswick – 2.5 nm required |

Slide 17 Alternative arrangements to reduce any restricted access

| Topics agreed for consideration | Actions |
|---|---|
| PinS – future for aviation<br>All pilots to be PBN trained by 2020 (CHC already trained)<br>CHC AW139s are RNP 0.3 approved.<br>If PinS approaches are approved for Hornsea Three CHC can use them as they are already trained and equipped. | Orsted to find more detail on availability of PinS approaches |

| | |
|---|---|
| PinS being developed for Hornsea One Procedure requires 6 months to develop. Approval needed from SARG. | |
| Revised Plate for Chiswick – moving MAP CHC do not see requirement to move MAP and prefer circling approach. This would require 2.5 nm clearance form turbines. | Orsted to consider final design lay out in regard to circling clearance. |

## ANNEX I: Aviation Consultancy Presentation to CHC

# Hornsea Project Three

Aviation Consultation Meeting

CHC

Ørsted

21st February 2019

# Attendees

| Company | Name |
|---|---|
| Orsted | [redacted] |
| | [redacted] |
| | [redacted] |
| RPS Energy | [redacted] |
| Anatec | [redacted] |
| Aviateq consultant | [redacted] |
| CHC | [redacted] |

# Agenda

| | Item |
|---|---|
| 1 | Introductions |
| 2 | Objectives of meeting |
| 3 | Hornsea Three overview |
| 4 | CHC approaches to Chiswick and Grove platforms. |
| 5 | Available approaches post Hornsea Three<br>- ARA flights<br>- En Route Descents<br>- Shuttle flights<br>- Restricted approaches as a result of Hornsea Three<br>- Alternative arrangements to reduce any restricted access |
| 6 | Summary |



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# 1. Introductions and Meeting Objectives

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## 2 Meeting Objectives

- To understand the approaches presently flown by CHC to the Chiswick and Grove platforms and under what meteorological conditions these approaches are flown.
- To understand what approaches CHC will be able to continue to fly the Chiswick and Grove platforms with Hornsea Three and under what meteorological conditions these approaches will be flown.
- To understand what approaches CHC consider may be restricted as a result of Hornsea Three.
- To discuss with CHC whether there are alternative flight paths which could be flown to the Chiswick and Grove platforms which would reduce any restrictions on access arising as a result of Hornsea Three, and to consider how technology can be used to enhance safety and operations.

# 3. Hornsea Three overview

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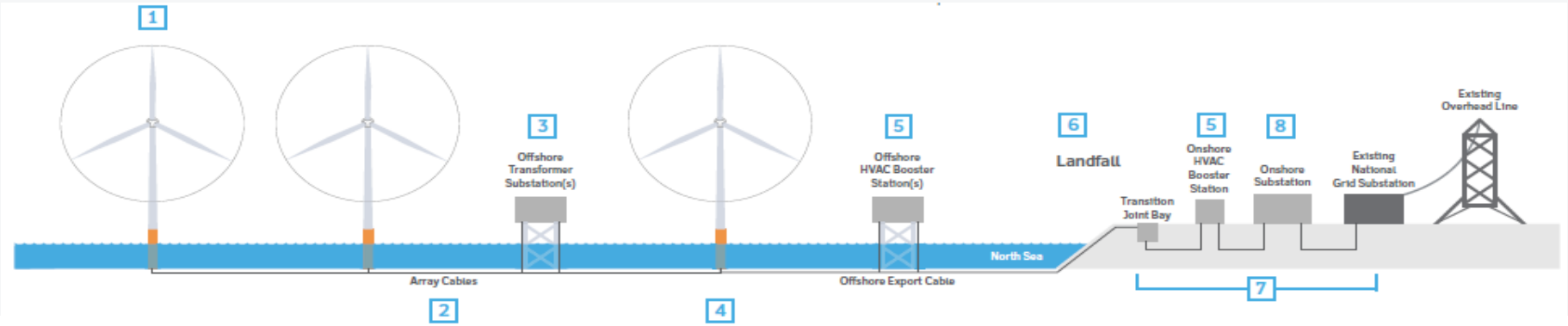
# Hornsea Three: The Proposal

- Up to 300 offshore wind turbines across 696 km$^2$ array area. A new network of subsea array cables, offshore substation(s), offshore converter stations and offshore accommodation platforms.

- Electricity generated transported via either a high voltage alternating current (HVAC) or high voltage direct current (HVDC) transmission system. Making landfall west of Weybourne (Muckleburgh Military Collection), before continuing south and connecting into a HVDC converter/HVAC substation and subsequently the National Grid at the existing Norwich Main Substation.

# Hornsea Three wind turbines and platforms

| Maximum number of turbines | Maximum blade tip height above LAT (m) | Maximum rotor diameter (m) | Minimum turbine Spacing (m) |
|---|---|---|---|
| 342 | 240 | 195 | 1,000 |
| 160 | 325 | 265 | 1,000 |

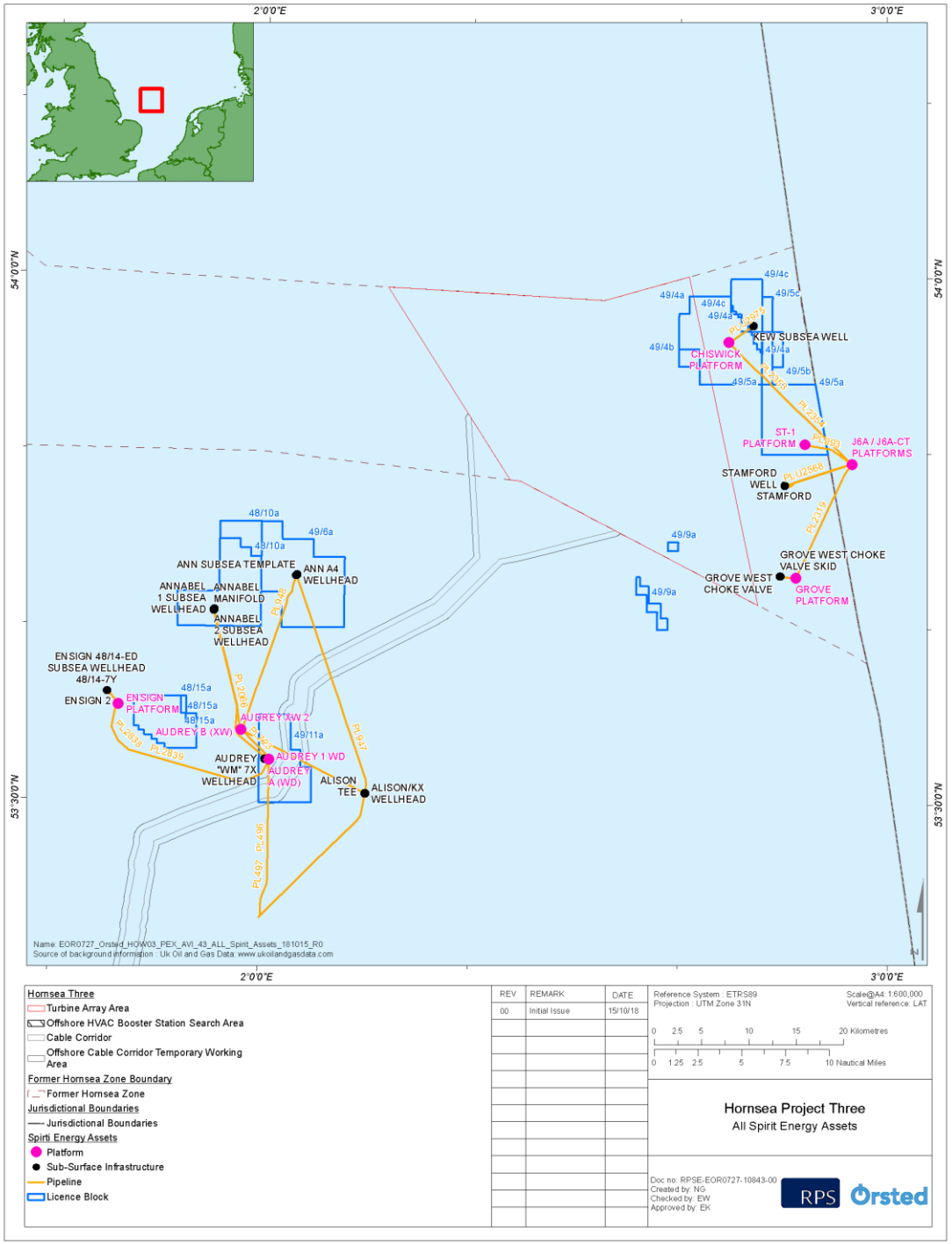
| Parameter | Location | Design envelope |
|---|---|---|
| Number of accommodation platforms | Array | 3 |
| Number of offshore transformer substations (HVAC only) | Array | 12 |
| Number of offshore convertor substations (HVDC only) | Array | 4 |
| Number of offshore booster substations (HVAC) | Offshore export cable route (40 to 60% or onshore) | 4 |

# Spirit Energy assets

Spirit Energy operate the Greater Markham Area, Producing fields straddling UK / Dutch sector

- J6 Platform - main processing hub and accommodation platform
- Chiswick platform – NUI
- Grove platform - NUI

| Platform | Distance to Hornsea Three (NM) | Distance to Hornsea Three (km) |
|---|---|---|
| Chiswick platform | 1.5 | 2.7 |
| J6A platform | 6.9 | 12.7 |
| Grove platform | 2.4 | 4.5 |
| J6A – Chiswick | 9.9 | 18.3 |
| J6A - Grove | 7.2 | 13.4 |



# 4. CHC approaches to Chiswick and Grove platforms

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# 5. Available approaches post Hornsea Three

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# Airborne Radar Approaches

- Define regulations which control approaches
- Define what weather limits apply

| | |
|---|---|
| **Flight restricted** | - Sea state greater than or equal to 6 m SWH (significant wave height) and/or<br>- Wind speed greater than or equal to 60 knots.<br>- Icing conditions |
| **VMC** | VMC Day:<br>- Cloud base greater than or equal to 600ft and / or<br>- Visibility greater than or equal to 4 km CAT.OP.MPA.247 |
| **VMC** | VMC Night:<br>- Cloud base greater than or equal to 1200ft and /or visibility greater than or equal to 5 km<br>*(VMC Night:*<br>- *Cloud base greater than or equal to 1000ft and/or*<br>- *Visibility greater than or equal to 5km SPA.HOFO)* |
| **IMC** | IMC conditions are defined as when it is not VMC |
| **ARA lower limits** | ARA lower limits are set in accordance with requirement to descend to 200 ft day (clear of cloud) and 300 ft night 100 ft below cloud) and being able to see platform from MAP (3/4 nm). |



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# Airborne Radar Approaches

– Discuss ARA, MAP and OEI requirements

| | |
|---|---|
| **ARA requirements** | An ARA can be flown with an Intermediate Fix at 6nm, Final Approach Fix at 4 nm (EASA GM1 SPA.HOFO.125 (a) General). |
| **ARA requirements** | The final approach path (from the FAF) can be flown out of wind where the drift angle does not cause increased workload. ((EASA GM1 SPA.HOFO.125 (a)(3) ) |
| **MAP** | It is permitted under AMC 1 SPA.HOFO.125 (e ) that pilots haven the option to move MAP from 0.75 to 1 or 1.5 nm to provide more room to fly a Missed Approach.<br>AMC 1 SPA.HOFO.125 (e )states that the decision range (MAP) should not be less than 0.75, i.e. more is permitted |
| **MAP** | A Missed Approach can be flown with a turn left or right turn. The MAP and any offset beyond 1.5nm will take account of the obstacle environment. |
| **OEI** | It is agreed that OEI can be flown along same route as an AEO go-around. The position of the MAP and go-around will take account of aircraft performance and the obstacle environment. |
| **MAP** | It is agreed that flights turn 10 degrees at 1.5 nm and then 30 degrees at MAP point (Fig 1 to GM1 SPA.HOFO.125) to initially avoid the destination platform. |
| **MAP** | It is agreed that a second turn can be made once at a safe height, in a similar manner to an onshore missed approach procedure. A straight climb to MSA does not have to be made. |



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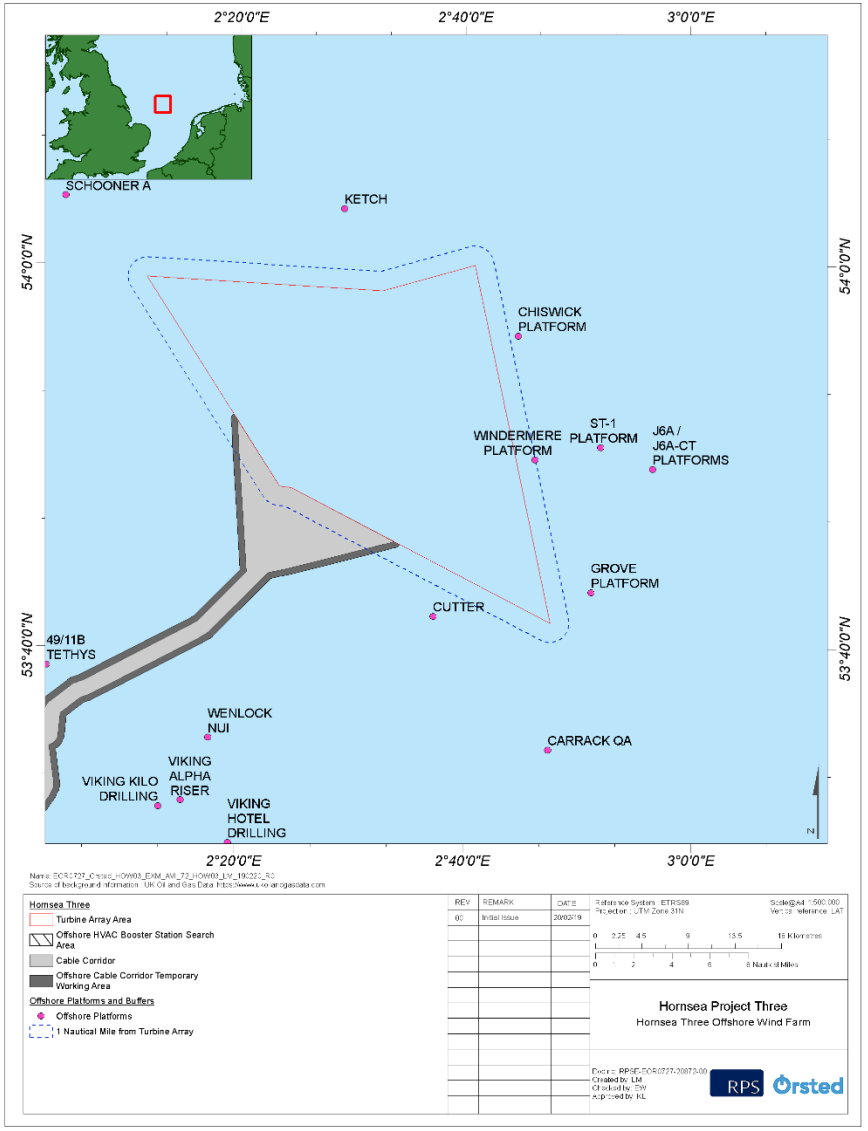
# En Route Descents

- Define regulations which control approaches
- Define what weather limits apply

| | |
|---|---|
| **Flight restricted** | - Sea state greater than or equal to 6 m SWH (significant wave height) and/or<br>- Wind speed greater than or equal to 60 knots. |
| **VMC** | VMC Day:<br>- Cloud base greater than or equal to 600ft and / or<br>- Visibility greater than or equal to 4 km CAT.OP.MPA.247 |
| **VMC** | VMC Night:<br>- Cloud base greater than or equal to 1200ft and /or<br>- Visibility greater than or equal to 5 km |
| **IMC** | IMC conditions are defined as when it is not VMC |



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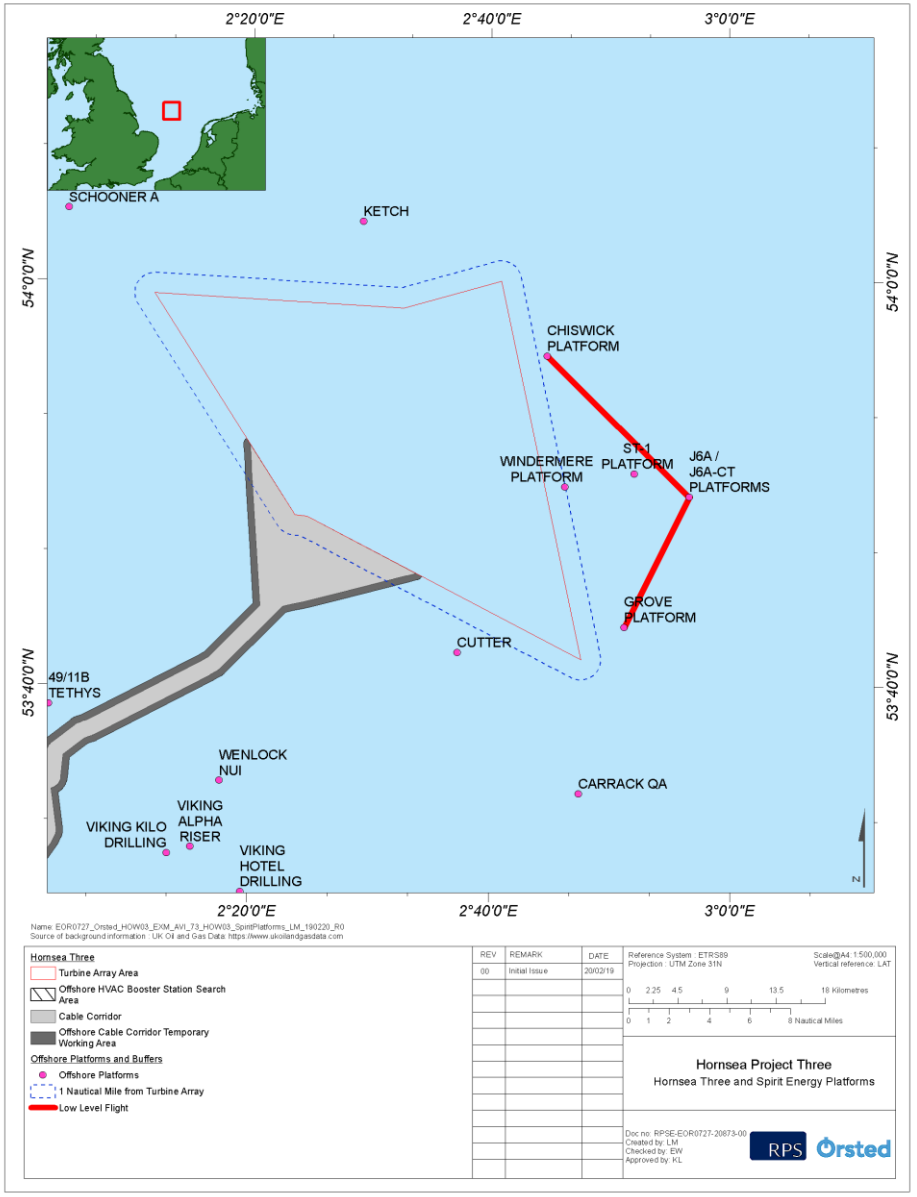
# Shuttle flights

- Define regulations which control approaches
- Define what weather limits apply

| | |
|---|---|
| **Flight restricted** | - Sea state greater than or equal to 6 m SWH (significant wave height) and/or<br>- Wind speed greater than or equal to 60 knots. |
| **Shuttle flights** | In Class G airspace when flying between offshore locations where the overwater sector is less than 10nm, VFR flight may be conducted when the limits are at, or better than, the following:<br><br><u>2 pilots:</u><br>- Day 300 ft clear of cloud 2 km visibility *(or 2 nm (NAA))*<br>- Night 500 ft clear of cloud 5 km visibility.<br>(EASA SPA.HOFO.130). |



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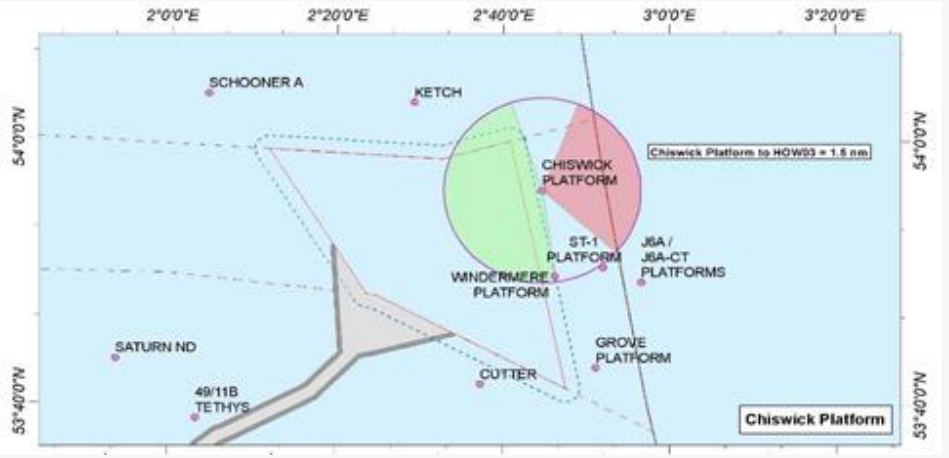
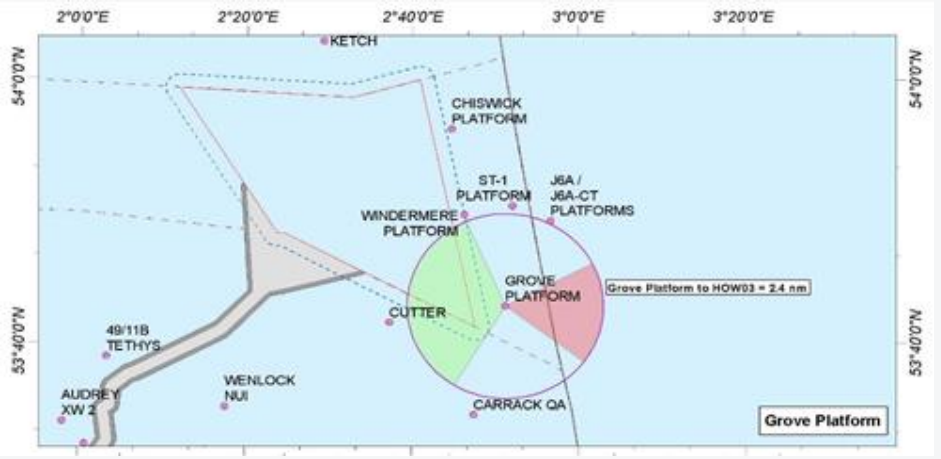
# Restricted approaches as a result of Hornsea Three

| Approach | Restriction |
|---|---|
| VFR | |
| ARA | |
| En Route | |
| Shuttle | |



# Alternative arrangements to reduce any restricted access

| Topics agreed for consideration | Actions |
|---|---|
| | |
| | |
| | |
| | |